Impact of Financial Risk Indicators on Banks' Financial Performance in Ghana

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Abstract

This research is to study the impact of some financial risk indicators on fifteen selected commercial banks' in Ghana. The indication from the augmented Dickey-Fuller unit root test results show that the data series after first difference at the first order achieved stationarity. The analysis of the data revealed the existence of significant long run relationship between bank financial performance and the variables of financial risk in the banking sector. The granger causality test results reveal that there is unidirectional causality flowing from the variables of financial risk This suggest that the indicators of financial risk strongly and actively stimulate and improve the financial performance of banks in Ghana. The study recommends that bank managers should improve on the management of all the indicators of financial risk variables in order to improve on the achievement of the objective of the firm.

Keywords: Augmented Dickey-Fuller unit root test, Granger causality test, Financial performance.

1. Introduction

1.1 Background of the Study

The International Professional Practice Framework for internal auditors specifies that inadequate risk management systems lead to little yield on investment and principally operate as passivity cost or a commitment which is more concerned with the recording of risks instead of their actual treatment. The financial crisis of 1980s made the central banks of the G-10 nations to active measures to manage financial risk. The capital commission settled capital requirement systems of Basel capital cord whose drive was on credit risk with necessity for market risk exposure. The Basel accord was revised with Asians crises of 1997 of new capital adequacy framework, also the 1988 Basel 1 focused on capital requirement which centered on credit risk management. The Basel II of 1999 has three pillars that are: minimum capital requirement, supervisory review and market discipline. The pillar 1 introduced three types of risk thus, credit risk, market risk and operational risk. The banking sectors were to access their capital requirement using basic regulatory standard. The core element in pillar 2 was that banks were to discover interest risk in their setups where national supervisors needed banks to carry test on their exposure to determine if banks were holding capital corresponding to interest rate risk. The pillar 2 adds unpredictability as it allows supervisor to vary their capital requirement.

Financial crisis of 2007-2008 resulted in the collapsed of well-known financial bodies resulting to great recession of 2008-2012. The recession also added to European debt crunch [] (George, 2010). The crunch came from factors such as easy acquirement of loans by subprime borrowers and high value of subprime mortgages. The active phase of the crisis was evident through a liquidity crisis. Banks had well-known risk management frameworks, but the tools did not avert the financial crisis. It is important for banks to holistically and frequently assess the efficacy of financial risk management in reaching their financial performance objectives.

Financial crisis of 2007 to 2009, Basel III were created by bank regulators aimed to enabled banks with sufficient reserves to withstand in any financial crises in the future which also focused on liquidity risk, market risk and credit risk (Simone, 2011). Banking operations face excessive financial risk as Markowitz portfolio theory assumes that a risky investment earns more profits. Banks desire more profit so that they can pay their clients with the funds but regulatory agencies also aim at reducing financial crisis. Such methods are linked to high risk when providing financial services with financial risk (Helder , Dário José , & Renato Falci , 2011).

In the atmosphere of volatility, all financial institutions are faced with financial risks such as credit risk, liquidity risk, interest rate risk, foreign exchange risk, market risk, operational risk as well as other business risks (Khizer, Muhammad, & Shama, 2011). Liquidity risk arises due to a bank incompetence to meet its due liquidity obligation, that is, the danger of being unable to liquidate a portion at reasonable price and (Arif & Nauman , 2012). A viable banks activity involves engaging in financial intermediation, provision of service, provision of loans to customers, and overall management of risk. This sounds for financial system to be

evaluated from an efficient perspective other than the institution (Rudra & Jayadev, 2009). Financial risk management supports financial institution to put in place to reduce the potential losses that comes as a result of reservations in the financial market (Aleksandra, Dalia, & Julija, 2009).

Risk management is now a policy tool used for measuring risk in investment and business institution. In pre-Markowitz era financial risk was considered as correction for expected return. Markowitz revealed that to measure uncertainties associated with return of each investment; we can employ standard deviation (Aleksandra, Dalia, & Julija, 2009). These simple procedures are imperative for allowing instant constant order of investment. To understand and minimize risk, the use of financial theory and risk management aids investors to make business very competitive and attractive. It is indispensable for commercial banks to appraise the efficiency of their financial risk management structures. Efficiency is the quality of being able to bring about an effect. One objective of commercial banks is to make profits and have bearable financial performances that increase the means of its shareholders. Risk management is a fundamental mandate of commercial banks business undertakings as they are exposed to different risks in pursuit of their objectives. Commercial banks are based on the active management of financial risks associated with their operations and activities. Banks are responsible for achieving evenness between risk and return while decreasing further uncertainties on their daily doings.

African banks have been centering on financial performance in varied ways over the past two decades. A lot of bank managers are probing for means of successful financial performance by involving in a primary transformation of banking operation (Olweny & Shipho, 2011). Most of African banks have introduced new modifications of advancing with better-quality technology intended to increase performance which also affects most banks as they prepare complicated balance sheet which have greater risks in asset and liabilities. Most banks adopted new advancing strategies to both small and medium business with the aim of improving performance has led to loan default henceforth credit risk takes a major portion of financial risk in Africa. Rapid increase in microfinance and internet banking in Africa has also increase financial risk as many customers are poor in the use internet banking (Ongore & Kusa , 2013). Corporate governance provides a disciplined structure through which a bank sets its objectives and the means of attaining them, as well as monitoring the performance of those objectives.

The reviews aim at improving the risk management framework and providing assurance whether risk management is promoting realization of the desired organizational goals.

On August 1, 2018 the Bank of Ghana revoked the licenses of five banks namely: UniBank Ghana Limited, the Royal Bank Limited, Beige Bank Limited, Sovereign Bank Limited and Construction Bank Limited into a consolidated Bank due to risk management malpractices which could have been mitigated if the risk management framework was effective. The Bank of Ghana created consolidated Bank to take over these five struggling Banks of which three of the banks obtained their banking licenses under false pretenses through the use of suspicious and non-existent capital. One of the banks had Non- performing loans that

constitute 78.9% of total loans and advances while the other has a capital deficit of GHC 7.4 billion compared to the regulatory minimum of GHC400 million, Bank of Ghana Report in 2018.

It is therefore, important to measure the effectiveness of risk management in the banking sector as what gets measured gets managed. Commercial banks need to effectively ascertain and manage their financial risks to promote sustainable and healthy financial performance. Whereas other studies have focused on the correlation between risk controlling and financial performance, this study will determine the effectiveness or success of financial risk management practices in promoting achievement of the financial performance objectives of commercial banks in Ghana.

1.2 Financial Risk Management

Financial risk management is the practice of utilizing financial derivatives to ease various uncertainties facing commercial banks. The uncertainties facing commercial banks are defined as risks. Risk is defined as uncertainty surrounding the goals of commercial banks. Financial risk management is a process that pursues to eradicate, minimize and control uncertainties facing banks. Risk management follows a prioritization process by putting more focus on risk with the greatest impact on objectives and high likelihood of occurrence whereas risks with lower likelihood of occurrence and low impact on objectives are handled later (Stulz, 1996). Commercial banks practice financial risk management to promote success and create wealth to their shareholders.

Financial risk management upturns the chances of banks in achieving desired levels of financial performance, create wealth and comply with legal and regulatory requirements. Financial management is made up of risk management, a capital function, financial forecasting and costing, accounting and information systems, and domestic controls. In applied terms, the significant feature of financial management is risk management, which is made of calculated, and capital planning, asset-liability management, and the management of a bank's business activities and financial risks (Greuning & Bratanovic, 2009).

According to ISO 31000(2009) the main components of risk management are the identification, calculation, and observing of the risk profile, including banking and financial risks to reduce the exposure to loss by the banks. Risk management embroils several steps for each type of financial risk and the overall risk profile. These steps include recognizing the risk management objective, risk management focuses, and events of performance. The most significant ones are identification and measurement of specific risk exposures, including valuation of understanding and performance to expected and unexpected changes in underlying factors. Decisions must also be made regarding the acceptable amount of risk exposure, the methods and mechanisms available to hedge excessive exposure, and the choice and execution of enclosing transactions (Greuning & Bratanovic, 2009).

The responsibility for diverse pieces of risk management must be apportioned, the value of the risk management process must be weighed, and the skilled and diligent implementation of obligations must be ensured. Effectual risk management, particularly for superior banks and

banks managing in liberalized and viable markets, necessitates a formal process. In unindustrialized economies, specifically those in transition, volatile, economically unpredictable, and insubstantial market environments considerably inflate the variety and degree of coverage to financial risk. Such environments render risk management even more complicated and make risk management process more severe.

According to (Greuning & Bratanovic, 2009), financial risks consist of two types of risks namely: Traditional banking risks, which involve credit, risk, solvency risks and treasury risks. Treasury risks are grouped into liquidity, interest rate, currency and market risks. This study will assess the effectiveness of five types of financial risk management practices, according to (Greuning & Bratanovic, 2009), on financial performance of commercial banks in Ghana.

1.3 Financial Performance

Financial performance is made up of different strategies of assessing how well an organization is utilizing its assets to generate income. Financial performance is described by (Richard, 2009) as a measure of how effectual a bank creates revenues from its capital. Financial performance of a bank is measured by evaluating a firm's creditworthiness, liquidity and cost-effectiveness. Profitability is a guide of the net outcome activities and policies commenced by commercial banks and maintain its stability and growth (Greuning & Bratanovic, 2009). The effective way to analyze the financial performance of banks comprise the Return on Assets (ROA), which measures benefit per each invested unit, and Return on Equity (ROE), which measures accounting earnings for a dated per unit of shareholders" equity.

1.4 Financial Risk Management and Financial Performance

Risk management has shifted its attention on modelling financial instrument and ensuring regulatory compliance than improving financial gains. (Banks, 2004). He emphasized that managing and controlling financial risks increase bank value. Therefore, their primary responsibility is to reduce financial risk exposure that may affects banks profit. Companies perform good and stable forecast on income and cash flows when they reduce future uncertainties (Goldberg & Drogt, 2008). Management of financial risk is to prevent monetary difficulties and cost (Goldberg & Drogt, 2008). Risk management enhances a firm to gain competitive advantage to improve its profitability (Stulz, 1996). Financial industry requires regulatory activities and dynamic business practices on the perspective of financial risk management.

Financial risk occurs as a result of uncertainties of loans defaults, liquidity management, volatility of interest rate and changes in foreign currency rates. Decisions involving banking activities therefore have an element of risk which has effects on the overall financial performance of the banks as measured through various parameters which includes net income, return on assets and return on equity (Athanasoglou, Brissimis, & Delis, Bank- Specific, Industry- Specific and Macroeconomic Determinants of Bank Profitability, 2005)]. It is concluded by (Bikker & Metzemakers) that the main objective of financial risk management

framework is to promote financial performance in banks as risk management promotes timely cautionary system of checking relevant indicators that may derail the company from attaining its desired financial performance goals. It is, therefore, imperative that banks manage financial risks to ensure stable and improved financial performance. Independent assurance to stakeholders on the efficiency of risk management framework is of high importance to provide useful information in achieving organizational objectives. IPPF (2010) outlines three approaches that may be used in determining the effectiveness of a risk management process; process elements approach, fundamental principles approach and maturity model approach. A complete risk management framework offers a clear link between the set objectives, established controls, achievement of the objectives and assurance across all levels of the organization.

2. Literature Review

2.1 Introduction

This chapter critically presents the models and other available literature relating to the study topic. The chapter is organized in three sections. The first section covers the theoretical framework on financial risk management. The second section includes the determinants of financial performance including financial risk management, bank deposits, and bank size. The third section covers the empirical studies on the effects of financial risk management on the financial performance of commercial banks in Ghana.

2.2 Theoretical Review

This study will be based on the agency theory, theory of optimal capital structure, new institutional economics theory, and maturity model approach theory as it strives to determine the success of financial risk management in promoting acceptable financial performance by commercial banks in Ghana.

2.2.1 Theory of Financial Intermediation

This theory was advanced by (Akerlof & Milbourne, 1980) in which financial intermediation is a amalgamation of institutional tool and market needs of different economic entities whose main aim is to accumulate money from public and legal bodies and lend it on commercial conditions which has an exposure to financial risk. The theory was centered on reducing costs necessary for stimulation of behavior of borrowers in creditors' interest (Sharp, Alexander, & Bely, 2011). Later the theory was modified by (Vishnevsky, Matyushin, & Annenkov , 2008) and they showed that financial intermediation is a variation of traditional theory that explained execution of banks using prices, quality, quantity and temporal evidence of assets that was due to invention of financial innovation.

The financial intermediation manages the traditional function of banks in transfer of risk and why intermediation should perform such function (Sharp, Alexander, & Bely, 2011). The traditional theory of financial intermediation was established on transaction and information approach. The major factor used in financial intermediation is based on information asymmetry and it's based on the type moral hazard or adverse selection, which demands cost

verification and also auditing processes. Information asymmetry creates imperfection in the market. Perfect financial markets in the neoclassic theory displayed that individual does not influence prices, no transaction costs, borrowing conditions are indistinguishable and all investors have homogeneous expectation. Exceptional attention was given to factors that influence depositors to withdraw their money from banks, which consequently leads to liquidity risk was a major issue due to asymmetry information.

The regulation of money distribution of saving and financing the economy influences the solvency and the liquidity of intermediaries leads to efficient refining and recovery of debts (Diamond & Rajan, 2000). Depositors face liquidity risk from the sensitivity of requiring liquid funds, trade-off between liquidity and profitability enables them to hold their funds in form of deposits, though according to Diamond model depositors do not have prior knowledge on when they will experience liquidity risk. Banks are required to sell more profitable and less liquid assets for depositors to hold liquid assets thus reducing profit opportunities if many depositors withdraw their funds, other customers may follow suit a behavior referred to as bank run hence exposing the banks to liquidity risk (Aleksandra, Dalia, & Julija, 2009).

The third approach founded on transaction cost developed by (Fama, 1980), was based on differences on technologies used. Transaction cost include transfer cost, cost for research evaluation and monitoring thus the role was to transform the characteristic of financial assets offering them with liquidity and opportunities for placement. Financial intermediaries a voids wasteful duplication of audit cost on part of all creditors. On the other side loan commitment may reduce borrowing rate hence reduction in interest rate hence profits and this can reduce moral hazard on the borrowers' side and providing basis for debt renegotiation.

They dispute that intermediation lowers participation costs but the world has faced direct partaking of the public in financial markets. The theory posits that the cost of trade has reduced which assisted direct participation of homes. The duty of Intermediaries of risk management does not explain increase in mutual funds and the use of financial derivatives. The foundation of financial risk management is the avoidance of bankruptcy of a firm persuaded by monetary and financial factors which focuses the firms' balance sheet against severe losses of money and uncertainties such as foreign exchange risk, interest rate risk as well as credit risk (Sharp, Alexander, & Bely, 2011). The revised theory suggests the market as dynamic, innovation and financial transformation, presenting financial intermediaries as risk-taking providers of financial service industries with acceptable customer focus for both borrowers and savers with risk management taking the central stage.

2.2.2 Prospect Theory

This theory is important in behavioral finance due to its purpose of expected utility theory. The theory explains how individuals treat gains and losses differently and how individuals get inspired not to maximize expected financial returns but rather expected utility of their actions (Tversky & Kahneman, 1986). The use of utility theory to prospect theory is built on expectation of expected utility of its outcomes (Paul, Mark, Nigel, & Emma, 2001). Amalgamation of asset is satisfactory if its utility surpasses the utility of other assets in terms

of economic outcomes (Nicholas, 2012). The frequency of risk aversion is known for simplifying risky selections. The theory hypothesizes that the disutility increasing from a reduction in wealth is greater than the utility resulting from a rise in wealth of the similar size. It further explains that individuals demand risk premium to involve in trade with an element of risk in return, depending on performance targets and past history gains and losses varies. Individual behavior in financial markets is affected by social influence that maximizes the empirical pattern of transactions on the market. Thus, different behaviors' can be understood as responses to different market circumstances leading to different implications (Paul, Mark, Nigel, & Emma, 2001).

Prospects theory recognizes that the utility curve is not a straight line. It advances the notion of utility in useful and accurate direction. It adds insight that utility curve differs in domains of gains from losses (Plott, Charles, & Kathryn , 2007). The shape of the prospects theory value curves is similar across individuals. The curve is S- shaped thus its convex below reference point. The slope of the curve measures sensitivity to change. The curve is more sensitive to origin and become less progressively less sensitive. The s curve means people tend to be risk averse in domain of gains and risk seeking in the domain of losses (Paul, Mark, Nigel, & Emma, 2001).

2.2.3 Risk Management Theory

Risk management theory was developed by (David , 1997) with the aim to study why risk management was required, and how banks should manage risks such as credit and market risk. The theory specifies that both credit and market risks would have either direct or indirect effect on banks survival (Eichhorn, 2004). Some would anticipate credit risk signs to impact banks profitability if there is no effectual and effective credit risk management (Ngumi, 2013). The theory ascertains loss of value as Market risk causes a change in net value of asset due to change in interest rate, exchange rate, equity and commodity prices (Wu & Olson,, 2010).

Managers are concerned with general risk and have minimum concern with individual risk of portfolio components, as managers are capable of window dressing the bank position. The need for total risk show that amount of risk cannot be concentrated as risk of a portfolio is not just a sum of component as per Markowitz theory. This suggests that portfolio risk must be determined by portfolio revenue that is invariant to changes in portfolio composition (Banks, 2004).

Regulatory requirements and alternative selections demand managers to think risk return trade off, Measurement of risk is expensive thus bank managers deal between accuracy and cost (Sovan, 2010). Trade off will have profound effects on any method adopted by the bank. They have one risk measurement goal knowing to a high degree with precision and the maximum loss that the bank will likely experience. Regulators may fix capital requirements to be bigger than estimated maximum loss to ensure non-failure. Risk management theory has two principle approaches to measurement of risk, scenario analysis and value at risk (Sovan, 2010). Scenario analysis approach does not require distribution assumption of the risk calculation and it's very subjective and assumes that future results will resemble those of the

past (Wilfred, 2006).

Value at risk (VAR) uses asset return distribution to estimate the potential losses. Monte-Carlo simulation and analytical VAR method are two-principle method of estimating VAR and they enable managers to estimate forecast. They have advantage of computational efficiency and tractability though they may show non-normal distribution experiencing fat tails reflecting inconstancy of return volatility. This method incorporates sound economic theory that incorporates market structure (Muhammad & Bilal, 2014). Where there is non-normal distribution student t is appropriate, it's useful for fat tails distribution since it's aimed at describing the behavior of portfolio returns. Analytical value at risk uses standard portfolio theory; the return distribution is described in terms of variance and covariance representing risk attributes to a portfolio over horizon (Sovan, 2010).

2.3 Determinants of Financial Performance

Profitability is one of the crucial measurements of financial performance. It mainly categorizes factors affecting commercial banks performance into two; internal and external factors, (Dhankar, 2011). The bank's policy objectives and management actions largely influence internal factors (Staikouras & Wood, 2004). External factors are related to the sector the firm operates in and they may be universal or reflected in the wider economic, governmental and legal environments (Athanasoglou, Brissimis, & Delis, Bank- Specific, Industry- Specific and Macroeconomic Determinants of Bank Profitability, 2005). Risk management is one of the major internal factors that commercial banks use to achieve their desired financial performance objectives.

It has been concluded by (Peng, 2006) that performance of commercial banks is mainly influenced by firm level factors like cost controlling ability and risk management proficiency. Is revealed by (Guru, Staunton, & Balalashanmugam, 2002) that efficient management of banks was an important factor that influences high profitability of banks

2.3.1 Financial Risk Management

According to (Greuning & Bratanovic, 2009), financial risks are classified into traditional risks and banking risks. Traditional risks include traditionally accepted threats arising from balance sheet and income statement structure, which include credit and solvency risks. Treasury risks are related to the capital of the business and include liquidity, interest rate, currency and market risks. The banking sector has emphasized the significance of financial risk management in the recent past (Glaum, 2000). This is because they influence business activities to a great degree (Triantis, 2000). Financial risks can be of different forms. Financial risk management activities in commercial banks are carried out at various organizational levels including the strategic level. This involves various activities, which includes risk identification, risk assessment, risk measurement, risk monitoring and controlling. The overall responsibility of financial risk management in commercial banks rests with the Board of Directors. The Board should therefore outline the financial risk management strategies and formulate clear policies and procedures towards effective management of risks.

There are outward financial risks, which depend on changes in financial markets, and also in-house financial risks resulting from within the organization itself (Eichhorn, 2004). External financial risks may be attributed to uncertain factors of transaction exchange, product prices and interest rates (Schönborn, 2010). This study will assess five types of financial risks characterized as follows; interest rate risk, credit risk, capital management risks, liquidity risks and foreign exchange risks. These represent the major categories of financial risks according to (Greuning & Bratanovic, 2009).

2.3.2 Credit risk

Loans in the bank are the major source of credit risk and other sources are foreign exchange, interbank transaction, trade financing, futures swap, options bonds and extension of commitment of guarantee. The practice of Basel I committee is made up of establishing credit risk environment where the board of director have the responsibility of review and implementation of credit risk strategy approved by the board for controlling, monitoring and measuring credit risk. Banks should maintain appropriate credit administration measurement and monitoring procedure effective, administration system of monitoring overall composition of credit portfolio and develop to utilize an internal risk rating system in managing credit risk. They should take into consideration of potential future changes in economic conditions during assessment of credit risk and exposure. Major banking challenges are as a result of low credit standard for borrowers and bad management of portfolio. It is stated by (Muhammad & Bilal, 2014) that credit risk might lead credit event such as failure to meet obligation and bankruptcy. It has been indicated by (Owojori , Akintoye, & Adidu , 2011) that the reported data from liquidated banks show that inability to collect loans and advances given to customers related managers was a major cause of credit risk. The research by (Anila, 2015) focusing on factors affecting performance of commercial banks in Albania bank size was used as one of the independent variable. Capital adequacy had negative and significant relationship with the performance of banks. Different authors who got contradicting results where capital adequacy had a positive relationship with financial performance (Frederic, 2014).

Research by (Fan & Yijun, 2014) on the Impact of Credit Risk Management on Profitability of Commercial Banks in Europe. The main objective of the study was to analyze the effect of credit risk management and profitability of commercial banks in Europe. ROE and ROA measured the financial performance while NPLR and CAR are defined as proxies of credit risk management. 47 largest commercial banks in Europe were studied for the period from 2007 to 2012. The results reveal that credit risk management had positive effects on profitability of commercial banks. Between the two proxies of credit risk management, NPLR has a significant effect on performance while CAR has an insignificant effect on performance. However, from 2007 to 2012, the relationships between all the proxies were not stable. The study recommends management should control the NPL. They should evaluate the bank ability to pay back when borrowing.

Research conducted by (Muhammad & Bilal, 2014) on credit risk and performance of Nigerian banks from 2004 to 2008 revealed that there is a negative relationship between

credit risk and performance. Similar findings from different authors who researched on Australian State housing authorities found a negative relationship between credit risk and performance (Peter & Peter, 2006). A research conducted by (Hamid, Sanaz , & hadi, 2013) on effects of credit risk indicator on share-holders value of commercial banks in Iran showed negative effects of capital adequacy and level of doubtful debts to total loans on share-holders value. Credit risk and commercial banks in Nigeria using panel model approach for a period of 11 years has been studied by (Kolapo & Dapo, 2015). The proxies used in their research for credit risk had a positive correlation with performance. The finding demonstrated that Nigerian banks should enhance their capacity on credit analysis and on loan administration. Research by (Khizer, Muhammad, & Shama, 2011) found the ratio of non-performing loans to total loans to be positive and significant to performance for Pakistan commercial banks. In a study by (Abdullahi , 2013)] on banks in Nigeria for the years 2006 to 2010 showed that credit risk had a negative influence on performance this is in agreement with other authors like (Sackett & Shaffer, 2006).

Research by (Harison & Joseph, 2012) on credit risk and profitability of selected rural banks in Ghana, used capital adequacy and non-performing loans as proxies for credit risk and return on assets to measure performance. In their they used panel data from the period of 2006 to 2010. The results showed that non-performing loans had a positive and significant relationship to performance. Different authors found contradicting results for credit risk management and bank performance in Nigeria using panel data for 5 years from 2005 to 2009 where the result showed negative correlation between non-performing loan ratio, loan loss provision, loan to deposit ratio on all measures of performance which were return on equity, return on assets and profit after tax (Oyewole, 2010). Similar results by different authors whose research on impact of credit risk on banks' performance in Nigeria with a panel data of six banks from 2000 to 2013 was done using the random effect model framework and established a significant negative relationship between credit risk and bank profitability (Olawale, Tomola, Ayodele, & Ademola, 2015). This concludes that bank increased exposure to credit risk reduces profits.

In a research conducted by (Sujeewa, 2015) on impact of credit risk management on performance of commercial banks in Sri Lanka; used primary data collected from eight commercial banks out of 24 commercial banks mainly through an interview. Secondary data were collected from the Annual Reports of the selected commercial banks where panel data was used for the period 2009 to 2013. Return on Assets (ROA) was used as performance indicator and Loan Provision to Non-Performing Loans (LP/NPL), Loan provision to Total (LP/TL), Non-Performing Loans/ Total Loans (NPL/TL) and Loan Provision to Total Assets (LP/TA) were used as indicators of credit risk. Regression model using E-views software was used to establish the relationship between credit risk and profitability. The result shows that non-performing loans and provisions had a significant negative relationship to profitability, stating that credit risk had a negative impact on the profitability.

2.3.3 Interest Rate Risk

This is the cost of advancing or borrowing funds. Banks are required to have clearly defined

policies and procedures for controlling interest rate risk (Greuning & Bratanovic, 2009). In the 1980s and 1990s, „Gap Model‟ was commonly used by financial organizations to evaluate exposures to interest rate risk. Interest rate risk management consists of policies, actions and techniques in which bank use to minimize the risk of reduction of its net equity due to adverse changes in interest rates. Interest rate risk factors have negative effects on bank‗s earning and its economic position that are estimated in each currency that banks have interest-rate-sensitive securities and off-balance sheet positions. Changes in interest rates reduce banks earnings where investor may lose potential return if interest rates rise above a particular interest rate. A change in interest rates affects the value of the instrument (Supervision, 2000).

Interest rate risk affect banks in different ways including re-pricing risk which is the primary and most common form of interest rate risk that arise from timing differences in the maturity of banking corporation assets and liabilities (Supervision, 2000). The yield curve is expected shift due to changes in relationships between interest rates for different maturities of the same index. An unexpected change in interest rate gives rise to unexpected changes in the earnings spread between assets and liabilities of similar maturities (Kolapo & Dapo, 2015).

In the research of (Khawaja & Musleh, 2007) they found out that increase in interest rate depress borrowers and depositors but increases performance. Thus, when banks charge high interest rate they gain high return from borrower and at the same time discourage depositors by giving them low returns as they have no options but to accept the prevailing rate given by the bank. Other authors whose findings were similar used five major commercial banks in Pakistan, panel data for four years 2008 to 2012 and the findings showed a significant negative correlation between interest rate risk and performance (Waseem & Abdul, 2014). The global sub-prime crisis of 2007 to 2008 emphasized the importance of liquidity management in banking sector. The Basel Committee issued its "Principles for Sound Liquidity Management and Supervision, which gave two concepts of liquidity, funding liquidity and market liquidity. Funding liquidity refers to the ease which an organization can attract funding. Market liquidity is high if it's easy for an organization to raise funds by selling an asset, other than borrowing against it as collateral. Liquidity becomes a risk factor if the magnitude of impact changes randomly over time (Clemens, Iman, & Robert, 2015).

Profitability rises as interest rates rise due to a greater margin between the central bank's rate and the rates that are charged by a bank to its customer's. Financial performance of commercial banks is exposed to interest rates movements. Some banks issue interest-bearing deposits so that their profits decrease when rates go up resulting from increase in the compensation to depositors. The interest rate exposure affects banks cash flow and consequently affects their ability to lend if external funding expensive. It is therefore imperative for commercial banks to manage the interest rate risks facing them to enable them achieve the desired profitability levels.

2.3.4 Liquidity Risk

Liquidity risk originates from the likelihood of an organization being unable to tackle uncertainties resulting from changes in its cash inflows and outflows. Banks face the risk of

loan defaults which may become difficult for them to raise funds to meet possible increase on demand for loans. Black, Wright and Bachman (1998) defined liquidity ratios as the sum of funds that a company may have at its disposal to meet their maturing obligations. Higher liquidity ratios are termed healthy to the business and firms with high debt levels and low liquidity are more likely to fail. Commercial banks measure liquidity adequacy by their ability to obtain funds promptly and at a reasonable cost according to (Greuning & Bratanovic, 2009). They further assert that the price of liquidity is a function of market conditions and the markets perception of the inherent riskiness of the borrowing institution. Basel Committee, 2008 observed that liquidity risk management is of high importance because a liquidity shortfall at a single institution can have systemic repercussions to other financial institutions.

Liquidity compensates banks for anticipated and unforeseen balance sheet oscillations and makes available funds for growth (Greuning & Bratanovic, 2009). It is noted by (Devinaga, 2010) that banks are under regulation to and must adhere to determined thresholds of liquidity asset. They further argued that regulation ensures banks always hold sufficient liquidity to deal with possible bank runs. He further reiterated that a bank assumes the status of highly liquid if it has been able to amass enough cash and is in possession of other liquid assets that can quickly be converted to cash. To capture liquidity ratio in profitability model, he employed the loan to deposit ratio.

2.3.5 Capital Adequacy

It refers to the sufficient amount of banks capital that can absorb the shock that may arise in the course of the business. However, studies of (Hoffmann, 2011), showed a substantial negative impact of money on the profitability of the bank. The fact that there is contradicting empirical evidence shows that when a company has a higher capital ratio, it is likely to suffer lower profitability. This implies that setting up high regulatory capital may have adverse effects on profitability and ultimately bank performance.

It is observed by (Greuning & Bratanovic, 2009) that availability of capital to a financial institution should never be a substitute for bad management, poor risk management, weak internal controls and poor governance. The amount of available capital to a commercial bank as well as the cost of obtaining the capital is a crucial element in determining a banks competitive position. Banks facing capital shortage or with high cost of obtaining the capital risks losing business to their competitors and hence capital is a fundamental element in bank soundness.

Basel 1 Accord outlined the required capital to a bank, parameters of measuring risk exposure and guidelines stipulating the level of capital to be maintained. It set the lowest risk-based standard for capital adequacy at 8 percent of risk-weighted assets. In their study, (Devinaga, 2010) argued that capital also serves as a source of funds to the banks along with deposits and borrowings.

They maintained that capital structure, which includes shareholders' funds, reserves and retained profit, influences profitability because of its effect on leverage and risk. (Greuning &

Bratanovic, 2009) further suggested that those banks with the high level of equity are able to reduce their cost of capital which impacts positively on their profitability. (Karkrah & Ameyaw, 2010) presented evidence which revealed that the equity ratio which is the measure of the capital strength of the banks displayed a positive relation with the banks ROA

2.3.6 Bank Size

The ability of the bank to grow through profitability can be continued up to a given limit beyond which there is negative profitability. Diversification through noninterest income enhances banks profitability. Other studies indicate that broadening of the bank transactions does not automatically translate into increased bank profitability (Acharya, Hasan, & Saunder, 2006, DeLong, 2001). They therefore suggest that optimum level of non-interest income activities must be set.

All commercial banks are not the same and size appears to be a key determinant of various behaviors of banks. Firstly, big banks are able to attract more deposits and lend more money as compared to their smaller compatriots. Additionally, big banks tend to be more leveraged than the smaller ones. Finally, big banks tend to rely more on short term liquidity markets than the smaller banks. The size of commercial banks is therefore a crucial factor in determining their overall financial performance.

Market share is included by (Devinaga, 2010) in the profitability model as an external determinant. He reasoned that if commercial banks could be able to expand their market share they may as well be able to increase their income through increased market share. It is revealed by (Karkrah & Ameyaw, 2010) that market share can be used to realize prospective economies or diseconomies of scale in the banking sector. It is emphasized by (Devinaga, 2010) that one has to make a choice between deposits and assets as a proxy of banks market share as both deposits and loans represent commercial banks output.

2.3.7 Deposits

Deposits consist of the largest proportion of a bank's total liabilities (Greuning & Bratanovic, 2009). The composition and stability of the deposit base is a critical factor to the financial success of any commercial bank. They further suggest that some items within the deposit structure are intrinsically risky as compared to others. In most cases, deposits are the most inexpensive sources of funds for banks and there contribute positively towards profitability.

The more deposits a commercial bank can collect, the superior is its aptitude to advance more loans and consequently make profits (Devinaga, 2010). There exists a significant positive relationship between ROA and total liability to total assets as determined by (Hussein, Hela, & Walaa, 2015)] to capture deposits in the model.

2.4 Empirical Review

In the study by (Ofosu-Hene & Amoh, 2015) on risk management and performance of listed banks in Ghana, secondary data of all listed banks on Ghana Stock Exchange over the period 2007–2014 was used. Panel regression data approach and a risk index were constructed for all listed banks on Ghana Stock Exchange. For this research the variables were risk index,

bank size, capital adequacy, liquidity risk, credit risk, inflation, exchange rate risk. The dependent variables were return on assets (ROA) and return on equity (ROE). The banking industry in Ghana had 32 registered banks. Seven were listed on the Ghana Stock Exchange (GSE), were selected. Banks that had been on the stock market for 10 years Data covering the period 2007– 2014 was used in the analysis a sample of 20 banks being used and secondary data based on audited annual accounts submitted to Bank of Ghana and banks website. Other data were sought from databases of Ghana Statistical service.

Risk management had no important relationship with return on assets to measure bank performance. Bank size and capital adequacy had no significant relationship with bank performance (return on assets). There was important relationship between credit risk measured by nonperforming loans and return on assets. Liquidity risk had a significant negative relationship with return on assets.

The results when using return on equity were as follows, risk management (RI) had a significant positive relationship between return on equity (ROE), which suggested that there is little impact on performance due to very small coefficient. Bank size had no significant impact on return on equity (ROE), this was consistent with findings when return on assets (ROA) was used. The result showed that whether equity is increased or not, it had no impact on both return on assets (ROA) and return on equity (ROE). Macroeconomic variables such as inflation and exchange rate risk also had no important impact on return on equity (ROE) and return on assets (ROA). Capital adequacy had a significant negative effect on return on equity (ROE). Non-performing loans had a significant negative relationship with return on equity (ROE). The repercussion is that, as banks non-performing loans increases, it decreases their profit. The authors endorse that the Ghanaian banking regulatory management may need a rethink and cautious during establishment of risk management policies and frameworks that ensures careful use of deposits to improve bank performance.

Research conducted by (Aykut, 2016) on the effect of credit, interest and foreign exchange rate risk on the bank index and bank stock returns. He analyzed 49 banks in total. The return distribution was negatively skewed for all variables, which meant asymmetrical distribution with a long tail to the left meaning big losses in the crisis periods. All data had large kurtosis values indicated leptokurtic distribution, which is more, peaked around the mean than a Gaussian distribution. The normality was rejected at 1% significance level by Jargue-Bera tests. Augmented Dickey-Fuller statistics indicated stationary condition by rejecting the unit root at 1% and 5% significance levels. The results revealed interest rate risk had a negative and significant effect on the volatility of bank profitability. The effect of Foreign exchange risk on bank return volatility was significant and positive whiles Credit risk had a negative and significant effect on bank index and bank returns volatility. This result supports the fact that the Turkish banking system had a large short position till the end of 2002 and small and long position after that time.

Hansen (Hansen, 2009) conducted analysis on the strategic foreign exchange risk management practice by Danish medium-sized non-financial, not-listed companies that are involved in international activities. The study revealed that foreign exchange risk had a

positive correlation to financial performance. The magnitude of the company had a significance positive relationship with performance.

A study has been conducted by (Ahmed, Akhtar, & Usman , 2011) on risk management practices of Islamic Banks. The research aimed at determining the firm's level factors, which have significantly persuaded the risk management practices of Islamic banks in Pakistan. The study concluded that size of Islamic banks had a positive and statistically significant relationship with financial risks that is both credit and liquidity risk.

It has been investigated by (Virginie, 2015) the effects of capital and liquidity ratios on banks' profitability according to their size. The data used was obtained from Bank scope, a regular financial database of Dijk desk. The sample included annual financial data of 1270 European banks for the period of 2005 to 2012. The banks were put into three groups of 346 commercial banks, 487 cooperative banks and 835 savings banks respectively. The independent variables were bank capital, liquidity risk and credit risk. The analysis revealed that Liquidity risk had a positive relationship on performance, which was significant for small banks. This means, averagely, small banks had less demand deposit in comparison to large banks where large banks had better access to external funds than small banks. Credit risk indicated a negative relation to banks profitability, which was significant for large banks. Thus, total loans had an association with decreased in profitability for large bank thus higher provisions indicates non-performing ratios with lower asset quality.

3. Research Methodology

3.1 Introduction

This chapter presents the research methods and procedures to be followed while conducting the study. It specifies the research design, study population, data collection and data analysis tools that will be used to conduct the study.

3.2 Research Design

This study adopted a descriptive research design to test the hypothesis over the ten years period (2007 to 2017. A research design is described by (Mugenda & Mugenda, 2003) as the plan of investigation envisaged to obtain answers to research questions in a form understandable by all. (Kothari, 2004) further includes surveys and facts finding inquiries under descriptive research. The aim of descriptive research was the description of affairs as it existed at a given time. Descriptive analysis determines and reports the way things are and attempts to describe such things as attitudes, values, characteristics and likely behavior (Mugenda & Mugenda, 2003). A causal study approach was employed to determine connections between variables by scrutinizing existing occurrence and then searching back through available data to try to identify reasonable contributory relationships.

The study determined cause and effect relationship and understood which variable was dependent and which is independent. This research design was the best in explaining if two variables were related and if they varied together with the help of enough information or data for testing cause and effect relationship

3.3 Target Population

The population is the total number of components that conform to some general set of specifications. The population for this study was the 15 commercial banks in Ghana, as at 31st December 2017). It is stated by (Mugenda & Mugenda, 2003) that the target population should have some observable characteristics which the researcher aims at generalizing the results of the study. Data was collected for all the 15 commercial banks in Ghana.

3.4 Sample Design

A census research design was used for the study where all the 15 elements of the population under study will be analyzed.

3.5 Data Collection

Secondary data from audited financial statements of the 15 commercial banks was collected for five years, 2007 to 2017.Central bank of Ghana requires all banks to publish their audited financial statements publicly on an annual basis.

3.6 Data Analysis

This research employed descriptive statistics to analyze the data collected. It is argued by (Mugenda & Mugenda, 2003) that, descriptive statistics enables the researcher to get the meaningful description of scores and measurements for the study through the use of few indices or statistics. The analysis of data for this research will be carried out under the following: Unit Root Test, Johansen Co integration Test, Granger Causality Test.

Definition of Terms

ROA = Return on Assets

CR = Credit Risk

IRR = Interest Rate Risk

FER = Foreign Exchange Rate

LR = Liquidity Risk

CMR = Capital Management Risk

BD = Bank Size

BS = Bank Size

IRSG = Interest Rate Sensitivity Gap

TA = Total Asset

NFL = Net Foreign Currency between Assets and Liabilities

NPL = Non-Profiting Loans

TL = Total Loans

NPT = Net Profit after Tax

$$ROA = \frac{NPT}{TA} \tag{1}$$

$$IRR = \frac{IRSG}{TA} \tag{2}$$

$$FER = \frac{NFC}{TA} \tag{3}$$

$$LR = \frac{TL}{TD} \tag{4}$$

$$CMR = \frac{CR}{TA} \tag{5}$$

$$BD = \frac{TD}{TA} \tag{6}$$

$$BD = LOG(TD) \tag{7}$$

Putting equation (1) to (7) into a linear regression form we obtain

$$ROA_{kt} = x_0 + x_1 CR_{kt} + x_2 IRR_{kt} + x_3 FER_{kt} + x_4 LR_{kt} + x_5 CMR_{kt} + x_6 BD_{kt} + x_7 BS_{kt} + \varepsilon_{kt} \tag{8}$$

Where k is the index for each bank and t is the year, $x_0, x_1, x_2, x_3, x_4, x_5, x_6, and\ x_7$ are the regression coefficients and ε_{kt} is the error term.

The long-run relationship (Causal relationship) among the independent and dependent variables is expressed as

$$ROA = \sum y_i * ROA_{t-i} + FRF_{t-i} + U_t \tag{9}$$

Where ROA is the sum of lag value of the dependent variable, and FRF is the sum of the lag values of financial risk factors. Equation (9) above is used to determine the causal implication of the relationship between the dependent and the independent variables.

We first start by running a pre-estimation analysis, that is stationarity test. Test of stationarity is necessary because non-stationarity of variables give spurious regression analysis results. Johansen's (1991) multivariate cointegration technique is used to check for long-run relationship between the variables. This test is necessary since the Johansen co-integration test only accounts for long-run relationships between variables but it does not show the direction of the relationship or a breakdown in the system which Granger causality test take cares of in its application.

4. Data Analysis

4.1 Introduction

This chapter involves data description, analysis and results of the study. The study captures fifteen banks and measures their financial performance by using secondary data information gathered on eight proxies from 2007 to 2017 of the various banks. These proxies are banks' return on asset, credit risk data, interest rate, foreign exchange rate, liquidity risk, capital

management risk, bank deposit and bank size. Table 1.1 below gives the various means from the data variables used for the analysis. The average amount of ROA across all the banks is 1872119, the average credit risk is also 46605, the average interest rate is also 3.136 across all the banks, foreign exchange rate risk also has an average amount of 1915, the average liquidity risk is also 29724, the average capital management risk is also 68530, bank deposit is also 3214092 and average bank size across all the banks is also 6.469.

Table 1

Observation	Mean
Financial Performance 165	1872119
Credit Risk 165	46605
Interest Rate Risk 165	3.136
Foreign Exchange Risk 165	1915
Liquidity Risk165	29724
Capital Management Risk 165	68530
Bank Deposit 165	3214092
Bank Size 165	6.469

Source: Authors' Computation

4.2 Empirical Analysis

The empirical analysis of data for this research is carried out under the following:

a. Unit Root Test

b. Johansen Co integration Test

Granger Causality Test

4.2.1 Unit Root Test

Table 2 below shows the results from the Augmented Dickey Fuller (ADF) unit root performed on all the variables for the study.

Augmented Dickey Fuller (ADF) unit root test

Table 2. Unit Root Test for Return on Asset (ROA)

ADF Test Statistics	-5.5816	1% Critical Value	-3.4600
		5% Critical Value	-2.8800
		10% Critical Value	-2.5700

Source: Authors' Computations

Table 3 Unit Root Test for Credit Risk (CR)

ADF Test Statistics	-5.1706	1% Critical Value	-3.4600
		5% Critical Value	-2.8800
		10% Critical Value	-2.5700

Source: Authors' Computations

Table 4. Unit Root Test For Interest Rate Risk (IRR)

ADF Test Statistics	-7.2936	1% Critical Value	-3.4600
		5% Critical Value	-2.8800
		10% Critical Value	-2.5700

Source: Authors' Computations

Table 5. Unit Root Test For Foreign Exchange Risk (FER)

ADF Test Statistics	-6.6181	1% Critical Value	-3.4600
		5% Critical Value	-2.8800
		10% Critical Value	-2.5700

Source: Authors' Computations

Table 6. Unit Root Test For Liquidity Risk (LR)

ADF Test Statistics	-4.9113	1% Critical Value	-3.4600
		5% Critical Value	-2.8800
		10% Critical Value	-2.5700

Source: Authors' Computations

Table 7. Unit Root Test For Capital Management Risk (CMR)

ADF Test Statistics	-5.494	1% Critical Value	-3.4600
		5% Critical Value	-2.8800
		10% Critical Value	-2.5700

Source: Authors' Computations

Table 8. Unit Root Test For Bank Deposit (BD)

ADF Test Statistics	-4.7156	1% Critical Value	-3.4600
		5% Critical Value	-2.8800
		10% Critical Value	-2.5700

Source: Authors' Computations

Table 9. Unit Root Test For Bank Size (BS)

ADF Test Statistics	-5.5481	1% Critical Value	-3.4600
		5% Critical Value	-2.8800
		10% Critical Value	-2.5700

Source: Authors' Computations

The ADF test for unit root of variables is shown in table 4.2 above. The unit root test results give the test statistics and critical values at 1%, 5% and 10% level of significance for each variable tested. It is shown from the table that all the variables for the study are stationary at first difference, making the series integrated at first order. This is due to the test statistics being greater than the critical value at 5% significant level. Once the condition for stationarity of the variables is achieved, they are further tested for co-integration by running Johansen co-integration text to check for long-run relationship among the independent and dependent variables.

4.2.2 Johansen Co-Integration Test Results for Dependent and Independent Variables

Considering the stationarity of the variables at first order, the Johansen co-integration approach is applied to the variables to check the existence of long-run co-integration relationship between the indicator for financial performance which is the dependent variable (ROA) and the indicators for financial risk, that is, independent variables (CR, IRR, FER, LR, CMR, BD and BS). The decision rule for the co-integration technique depends on the maximum eigen value, the critical value and the likelihood ratio. The table below shows the outcome of the test.

Table 10. Johansen Co-Integration Test Results for ROA Model with CR & IRR

Test Assumption: Linear Deterministic trend in the Data				
Series: ROA, CR & IRR				
Lags interval: 1 to 1				
Eigenvalue	Likelihood Ratio	5% Critical Value	1% Critical Value	Hypothesis No. Of CE(s)
0.07899308	80.08	31.52	37.22	None**
0.11649275	33.60	17.95	23.52	At most 1**
0.24808906	13.41	8.18	11.65	At most 2
*(**) is interpreted as, rejection of the null hypothesis at 5% (1%) level of significance				
L.R. test indicates three cointegrating equations, at 5% level of significance				

Source: Authors' Computations

The test results in table 4.3 shows that the first null hypothesis of no co-integrating vector is rejected because the critical value of 29.68 is less than the likelihood ratio 80.8 at 5% level of significance. The second null hypothesis is also not accepted since the critical value of 17.95 is less than the likelihood ratio of 33.60 at 5% level of significance. Again, the null hypothesis of at most 2 co-integration vector or less is also rejected due to the critical value of 8.18 less than the likelihood ratio of 13.41 at 5% level of significance. Therefore, the results indicate that 3 co-integrating equations at 5% confidence interval. Based on the results showing that 3 co-integrating vectors being lower than the number of variables in the model, it implies that there is a long-run equilibrium relationship between financial risk indicators that is, CR & IRR and financial performance, that is, ROA. Apparently, the variables share mutual stochastic trend and are linked in a common long-run equilibrium relationship. This is to say, financial performance measured by returns on asset significantly correlate with credit risk and interest rate risk when loans are defaulted or repaid on time.

Table 11. Johansen Co-Integration Test Results for ROA Model with FER & LR

Test Assumption: Linear Deterministic trend in the Data				
Series: ROA, FER & LR				
Lags interval: 1 to 1				
Eigenvalue	Likelihood Ratio	5% Critical Value	1% Critical Value	Hypothesis No. Of CE(s)
0.1063137	140.49	31.52	37.22	None**
0.2165558	58.10	17.95	23.52	At most 1**
0.3967738	18.32	8.18	11.65	At most 2 **
(**) is interpreted as, rejection of the null hypothesis at 5% (1%) level of significance				
L.R. test indicates three cointegrating equations, at 5% level of significance				

Source: Authors' Computations

The result from table 4.4 shows that all the three hypothesis of co-integration vector. This is because in the first null hypothesis the critical value of 31.52 is less than the likelihood ratio of 140.49, whereas the critical value of 17.95 for the second null hypothesis is also less than the likelihood ratio of 58.10 at 5% significant level. Again, the third hypothesis is also rejected due to the critical value of 8.18 being less than the likelihood ratio of 18.32 at a 5% significant level. This means that that financial risk measures and the financial performance of commercial banks in Ghana share mutual stochastic trend and are linked in a common long-run relationship. The co-integration test result of long run relationship reveal that all the financial risk measures and the bank financial performance indicators are found to be co-integrated indicating the existence of long-run equilibrium relationship between the variables.

Table 12. Johansen Co-Integration Test Results for ROA Model with CMR, BD & BS

Test Assumption: Linear Deterministic trend in the Data				
Series: ROA, CMR, BD & BS				
Lags interval: 1 to 1				
Eigenvalue	Likelihood Ratio	5% Critical Value	1% Critical Value	Hypothesis
0.04592041	90.96	48.28	55.43	None**
0.08249399	44.30	31.52	37.22	At most 1**
0.12947068	21.70	17.95	23.52	At most 2 **
0.24896064	7.66	8.18	11.65	At most 3
*(**) is interpreted as, rejection of the null hypothesis at 5% (1%) level of significance				
L.R. test indicates three cointegrating equations, at 5% level of significance				

Source: Authors' Computations

The result from table 4.5 shows that all the three hypothesis of co-integration vector. This is because in the first null hypothesis the critical value of 48.28 is less than the likelihood ratio of 90.96, whereas the critical value of 31.52 for the second null hypothesis is also less than the likelihood ratio of 44.30 at 5% significant level. Again, the third hypothesis is also rejected due to the critical value of 17.95 being less than the likelihood ratio of 21.70 at a 5% significant level. However, the forth null hypothesis is accepted due to the fact that the critical value 8.18 being greater than the likelihood ratio of 7.66 at 5% significance level. This means that that financial risk measures and the financial performance of commercial banks in Ghana share mutual stochastic trend and are linked in a common long-run relationship. The co-integration test result of long run relationship reveal that all the financial risk measures and the bank financial performance indicators are found to be co-integrated indicating the existence of long-run equilibrium relationship between the variables. In general, there exist a long-run relationship between financial risk measures and bank performance measure in Bank. These suggest that the banks in Ghana seem to have low financial risk and over time could boost the financial performance of the banks into the long-run. However, since there exist stationarity of variables and subsequent co-integration is found to be in line with prior expectations, the application of conventional causality test between the financial

risk measures and bank financial performance variables will be appropriate.

GRANGER CAUSALITY TEST

The Granger causality test is used to determine movement of causality or lead-follow relationship between Return On Asset (ROA) and the various financial risks measures to examine whether the various financial risks measures can cause variation in bank financial performances or Return On Asset.

The result of the pairwise granger causality test is below:

Table 13. Pairwise Granger Causality Test Result

Pairwise Granger Causality Test		
Lags:2		
Null Hypothesis:	F-Statistics	Probability
CR does not Granger cause ROA	0.0091623	0.9238
ROA does not Granger cause CR	3.7872	0.05252
IRR does Granger cause ROA	18.53	2.21exp-16
ROA does not Granger cause IRR	2.7083	0.003505
FER does not Granger cause ROA	31.829	2.2exp-16
ROA does not Granger cause FER	1.1573	0.3201
LR does not Granger cause ROA	0.74177	0.3897
ROA does not Granger cause LR	2.1685	0.1418
CMR does not Granger cause ROA	0.025814	0.8725
ROA does not Granger cause CAR	0.30612	0.5805
BD does not Granger Cause ROA	0.0013058	0.9712
ROA does not Granger cause BD	6.3508	0.01222
BS does not Granger cause ROA	0.38449	0.5357
ROA does not Granger cause BS	9.2658	0.002527

Source: Authors' Computations

The Pairwise Granger causality test is conducted with a maximum lag of 2 on the first difference of the linear form of the variables is based on a decision rule. The null hypothesis says that there is no causal relationship between the correlates. The null hypothesis is rejected when the probability of the t-statistics given in the test result is less than 5%. Table 4.6 shows that at 5% level of significance, the indicators of financial risk do not granger cause the growth of financial performance or return on assets of banks instead causality runs unidirectionally from indicators of financial risk to return on assets. This is to say that when banks' total assets are invested over time, it will impact positively on the return on assets of these banks. However, there is no causal relationship between the indicators of financial risk and the financial performance measures of banks. This call for proper management of banks' total asset and the optimum allocation of these assets into various investment vehicles should be done with care. This explains the long-run test results that when banks have enough assets

and these assets are channeled into the right kind of investment, and allowed to mature over time, it will impact positively or an increase in the return on assets

5. Summary and Conclusion

5.1 Summary

The Ghana banking industry recently received a shock as a result of new capital and solvency requirement imposed on them by Bank of Ghana. This new regulation has led to several banks being shut down due to poor banking performance leading to low returns on asset and poor diversification strategies of investment. Therefore, the study set out to investigate the impact of financial risk indicators on banks financial performance in Ghana. Following our proposed aim, we hypothesize that bank financial risk indicators-CR, IRR, LR, FER, CRM, BD, and BS are positive functions of capital adequacy indicators. It was conceived that the findings of this study will be of great importance to researchers, policy makers, and financial analyst and even contribute to existing literature. This study stems from the theories of financial risk and the link between these concepts and banks' financial performance are established and also reports of past related empirical works with special attention on the aim, method of the study, findings and recommendations are all defined. The gap in these literatures is what this work intends to fill

5.2 Conclusions

Deductive econometric approach of research design is adopted for this study, and fifteen out of the nineteen existing commercial banks were sampled. Two predictor models of linear formation were specified to capture the argument in the study in relation to the financial risk variables- CR, IRR, LR, FER, CRM, BD, and BS. The data analysis techniques employed in this study include the Ordinary Least Square method, The Johansen Co-integration technique and Granger Causality procedure. Section four describes the data presentation of the study drawn from the fifteen studied sampled commercial banks. The results of the various econometric models employ in the study were also presented and critically analysed. The Johansen Co-integration test reveal a long-run equilibrium relationship between the correlates in Ghana. The Granger Causality test was also use to determine the direction of causality between the indicators of financial risk and banks financial performance measure, return on assets. The findings from the study indicate that the indicators of financial risk used for the study strongly impact the financial performance of banks in Ghana. This finding lead to the following conclusive remarks: The cause-effect analysis reveals that causality runs unidirectionally from the indicators of financial risk to return on assets (ROA). This however provides evidence for the existence of the impact of financial risk on bank financial performance in the Ghana banking sector. There is also evidence for strong long-run co-integrating relationship between the capital adequacy of banks and their financial performance in the long- run. This however supports the position that the indicators of financial risk strongly and actively stimulate, improve and even grow the performance and especially the financial performance of banks in Ghana. The study concludes that financial risk indicators strongly lead to financial performance of banks from the causality test result. There is also long-run equilibrium relationship between financial risk indicators and bank

financial performance, return on assets. These implies that proper diversification of banks' total assets can translate to improved financial performance of banks in Ghana through the window of efficient portfolio management, efficient asset selection and the application of matching principles to reduce risk. From the empirical findings of this study and the conclusion reached, we recommend that bank managers should improve on the management of all the indicators of financial risk variables- CR, IRR, LR, FER, CRM, BD, and BS in order to improve on the achievement of the objective of the firm.

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